NANOPARTICLES IN THE VICINITY OF THE ARC DISCHARGE

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The arc discharge between the graphite electrodes burning in the atmosphere of inert gases is one of the standard methods of nanoparticle synthesis. The arc is a very powerful light emission source, which is close to the blackbody. This radiation is scattered and partly absorbed by the nanoparticles. In the areas where a synthesis can occur theoretically, the radiation intensity of the arc is still quite high, and therefore, one should expect that the temperature of nanoparticles that absorb radiation may considerably exceed the local ambient gas temperature. A simple theoretical model of heating the nanoparticles, depending on their size and the parameters of the radiating arc and the surrounding gas is considered. Heating of nanoparticles by the radiation can affect the process of synthesis [1]. The degree of heating of the particle is determined by its geometry, which opens, apparently, additional possibilities for nonintrusive optical diagnostics.

An effect of intensive ultrasound on the suspension of soot microparticles and nanoparticles in the inert gas, resulting in the coagulation of relatively large soot particles and leading to the improvement of the efficiency of production of nanoparticles, as has been observed in experiments ((see., e.g., [2]), is discussed. The effect of the particles charge on the possibility of coagulation is analyzed [3].

The polarization forces in a weakly ionized plasma, acting on neutral atoms and molecules [4,5], are also considered. These forces may have a noticeable impact on the dynamics of nanoparticle synthesis and growth of soot particles and their thermal balance.

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4. M.N. Shneider, “Polarization Forces in the Vicinity of Nanoparticles in Weakly Ionized Plasma”, *Physics of Plasmas* **23** (2016) 094505.
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